Jan. 31, 1950 O. H. HASSELBAUM 2,496,208

ELECTRICAL CONNECTOR

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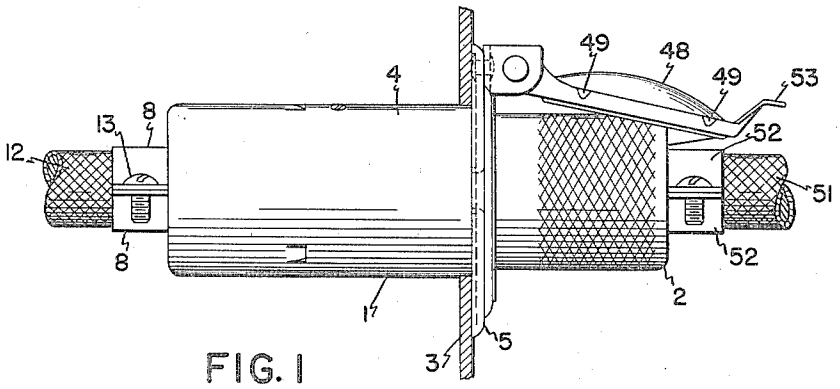


FIG. 1

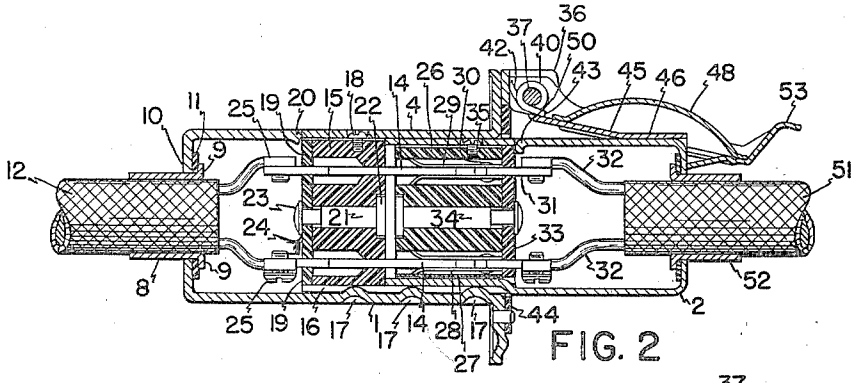


FIG. 2

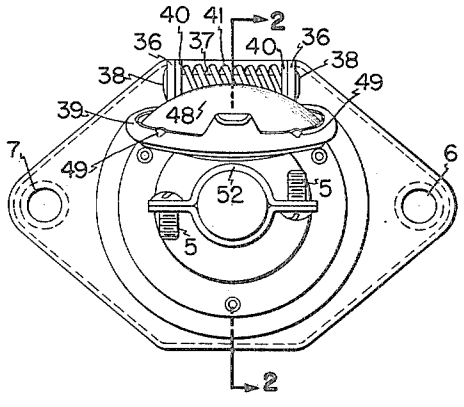


FIG. 3

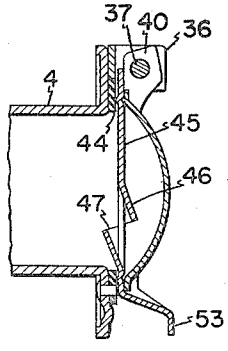


FIG. 4

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ELECTRICAL CONNECTOR

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1 Claim. (Cl. 173—328)

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The present invention relates to an electrical connector and, more particularly, an electrical connector for cables which may be exposed to outdoor weather conditions and rough usage. Such connectors may be used on the exposed sides of junction boxes, and in many other places. A particular use for the connector of the present invention is in making electrical connections between one part of an automobile and its trailer, or in coupling the trailer to some power supply.

It is always important in making electrical connections to have the electrical coupling elements secured in place, so that there will be little resistance between the socket on the one side and the engaging prongs on the other side. If the plug readily comes loose from the socket, an arc is frequently drawn which will burn out the socket or melt the prongs of the plug so that they are useless. Particularly in automobile connections for trailers and other units, it is essential that when the connector is put in place it will remain so and will not easily come out except when intentionally removed. It is further essential in connectors of the present type that they be protected from weather at all times, will withstand knocks, and are not readily tampered with by children. It is further important in electrical connectors of the type of the present invention to have the connectors strong, durable, protected from rain, and parts properly in the casing or housing so that always a good electrical connection is made.

The improvement of the present invention accomplishes this purpose, particularly in its application to connectors such as may be used on trailers or outdoor electrical circuits where it is desirable to have the connector always firmly and securely seated in its socket. The present invention provides these advantages and, further, is of such construction that connections are readily made and just as readily disconnected if desired.

The invention will be more fully explained in the specification below, when taken in connection with the drawings showing an embodiment of the same, in which Fig. 1 shows an elevation of the electrical connector; Fig. 2 shows an elevation in section taken on the line 2—2 of Fig. 3; Fig. 3 shows an end view as seen from the right of Fig. 1, and Fig. 4 shows a detail of the invention with the plug disconnected and the cover closed.

In the connector as shown in the figures, there are in general two parts—the socket portion 1 and the plug portion 2. The socket portion 1 is usually permanently fastened to a wall of frame board or plate 3, through which a hole may be cut to receive the case 4 of the socket. The case 4 may be provided with a flange 5 abutting the outside of the wall of plate 3, and the plate may be provided with screw holes 6 and 7 (Fig. 3) through which screws may pass to hold the plate 5 and its casing firmly to the plate or wall 3. The case 4 is provided with split end collars or clamps

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8, 8, which parts have within the case outwardly extending flanges 9, 9 separated from the inner end wall 10 of the case by means of an insulating sheet or gasket 11. The cable end 12 is clamped in the collar or clamp 8 by means of the clamping screws 13, 13, preferably pointing in opposite directions as illustrated at the other end (see Fig. 3). The pronged connectors 14, 14 are mounted and supported in an insulated phenolic thermosetting condensation product such as "Bakelite" or insulating base 15 of suitable material, which fits into the socket casing 4. This insulating element 15 is provided with a groove or keyway 16, which slides into and is aligned with a series of indentations 17, 17 in the wall of the casing 4, so that the piece 15 may be slid into its proper position.

On the opposite side of the socket, a set screw 18 threads through the wall of the socket into the insulating piece 15, locking it in position and also preventing it from sliding out. The prongs 14 are supported in the insulating member 15 and extend through the back thereof beyond the end cap 19, which rests against an indentation 20 pressed into the side of the socket case 4. The end plate or insulator 19 is perforated with openings just wide enough to receive the enlarged ends of the prongs 14, so that a snug fit is made by the prongs in the insulator plate 19. This end plate or cap is held or clamped to the main body 15 by means of a circular rivet 21, which is provided with a head 22 set in flush in the member 15 and a reduced opposite end member 23, the end of which may be riveted over a washer 24 lying flush on the end plate 19. In this way, the prongs are firmly retained in their setting within the socket 4. Terminal connections may be made by means of the individual connector wires in the usual fashion by looping them about terminal connector screws 25, 25 attached to each of the rear ends of the projecting prongs 14.

This assembly definitely locks the prongs in position within the socket casing and prevents any rotation after they are once fixed in place. The receptor elements for the prongs which are contained within the removable head or plug casing 2 are set in a cylindrical insulating block 26 which is held fast within the casing or plug cover 2. The block 26 is provided with a keyway slot 27 axially aligned and engaging the channel or keyway 28 in the plug cover 2, which channel 28 is adapted to engage the series of indentations 17, 17, 17 in the socket casing 4. It will be noted therefore that the channel 28 aligns itself when in position with the series of indentations 17, 17 in the socket casing or cover 4 so that both parts of the connector are properly connected together to provide the correct electrical connection. The two parts also fit snugly together. The block 26 is recessed to receive and hold spring forked connectors 29 between which the prongs 14 enter when the plug is put into the socket. The forked

members 29 are riveted together at their ends 30 with a connector strip 31 positioned between them. The connector strip extends out through the back of the plate or block, and the terminal connector wires 32, 32 are attached to this strip by terminal connectors in the usual manner. An end plate 33 is used over the back of the block through which the strip 31 extends. This end plate serves similarly as the end plate 19 and is held to the block by means of a centrally located rivet 34 similar in shape and use to the rivet 21 for the socket block or plate 15. A set screw 35 similar to set screw 18 may be used to hold the block 26 in place. The plug end or casing 2 of the connector, it will be noted, extends well into the socket and fits into the socket quite snugly so that there is no play between the plug and the socket wall. It is preferable to have the plug extend approximately half way into the socket.

Attached to the face plate 5 are two ears 36, 36 through which a pin or shaft 37 passes with enlarged ends 38, 38 providing a pivot or hinge for the cover plate 39. The cover plate 39 has two outwardly extending arms 40, 40 which fit within the ears 36 and through which the shaft or pin 37 passes, permitting the cover 39 to be freely hinged or rotated about the pin. A helical spring 41 surrounding the shaft 37 has one end 42 tensioned against the plate 5 and the other end 43 tensioned against the cover 39 providing a spring tension against the cover to keep it in a closed position or to exert a force in that direction. A rubber gasket or water-proofing member 44 fits over the face plate 5 around the socket opening so that when the plug is removed and the cover forces itself into a closed position it will come up against the gasket and make a good seal to prevent water from leaking into the empty socket. When the plug has been inserted into the socket, the cover must be opened to a position as shown in Figs. 2 and 3. The cover in this position acts to latch and retain the plug firmly in position. The cover member for this purpose comprises a plate or sheet portion 45 which is pressed out to form a shoulder or corner as indicated at 46 (Fig. 4) with the sheared edge 47 substantially at right angles to the sectional edge as indicated at 46 in Fig. 4. This pressed down portion is such as to fit snugly over the cylindrical end of the plug casing 2 when the cover is raised, with the portion 46 having the cylindrical section fitting snugly to the casing 2 and the portion 47 fitting snugly against the flat end of the casing 2. The spring 41 preferably has more tension than necessary merely to keep the cover down or prevent flapping. It exerts considerable force to hold the plug in position so that it would be practically impossible to remove the plug without purposely and forcefully raising the cover so as to free the end of the plug shell 2. The cover is also provided with a back member or cap 48 which will lie over and conceal the shoulder and the recess formed in the plate 45. This cover 48 may be spherically shaped and the edges of the plate member may be crimped over as indicated at 49 to hold the cap 48 in place.

The plug casing 2 may also be provided with an indentation 50 similar to the indentation 20 to limit and retain the block 26 in place. Through the end of the plug case 2 extends the cable 51 which is held and clamped in the end of the casing 2 by split clamp members 52, 52 similar in construction to the clamping elements at the other end of the connector. As has been previously mentioned, the prongs and socket plugs

are aligned together, so that when the plug is inserted in the socket the forked connectors in the plug will engage the pronged members in the socket. All that is necessary to insert the plug is to raise the cover by lifting the projecting finger 53 at the end of the cover and inserting into the socket in correct alignment the plug 2. After the plug is in position, the cover is released and it will come down against the end of the plug and hold the plug so firmly in position that no shaking or vibration will cause its disconnection. It is obvious also that the plug is readily removed simply by raising the cover slightly so as to clear the end of the plug, whereupon the plug may be pulled out.

A further feature of the present invention is that the projecting prongs are contained in the socket element while the receiving forked members are set in the plug element. This is particularly advantageous in the present invention since the socket is fixed and always out doors and shielded only by the cover, while the plug with its receptor may be stored and therefore protected when not in use.

Having now described my invention, I claim:

A connector of the type described, comprising an elongated metallic shell having an outwardly extending flange at the open end of the shell, a spring cover hinged in a pair of ears projecting outwardly from the face of the flange tensioning said cover when normally in closed position with the face thereof fitting closely around the rim portion of the opening of said elongated metallic shell, said cover having an inner base member with a slot therein perpendicular to the median line between said hinged ears and a tapered, concave indentation extending from one side of the slot tapering towards said hinge; a plug member adapted to engage within the elongated metallic shell for completing electrical connections therewith, said plug member being cylindrical in shape and of such a size to fit snugly within said metallic shell with the rearward portion thereof extending substantially beyond said ears, the outer shoulder of said plug member conforming to the shape of said indentation and slot and being seated therein when the plug is in place, said cover with the outer shoulder of the plug resting therein, locking said plug in place against outward axial motion and exerting pressure on the plug member towards said elongated metallic shell to maintain a tight electrical connection between the elements of the connector.

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